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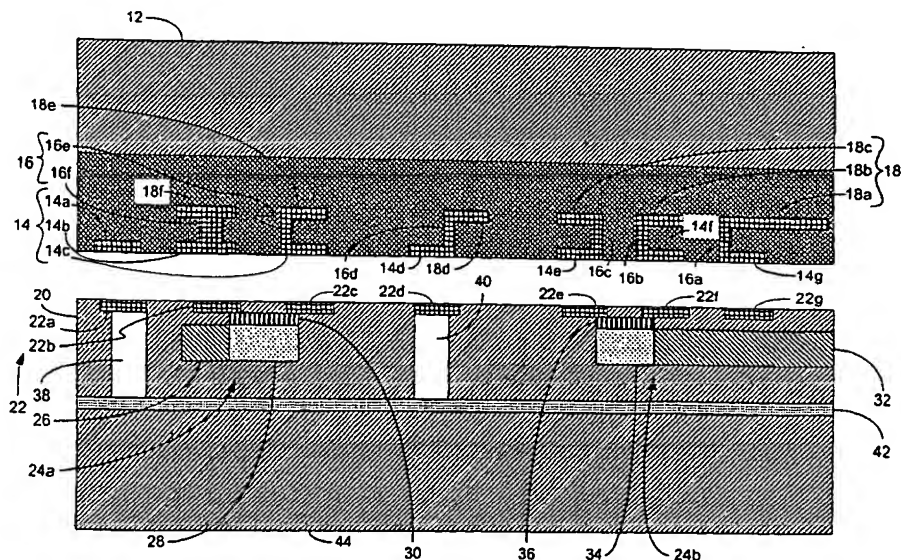
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ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: ELECTRICAL/OPTICAL INTEGRATION SCHEME USING DIRECT COPPER BONDING



(57) Abstract: An electro-optic semiconductor package and fabrication method provides enhanced performance. An integrated circuit (IC) having one or more IC contact pads is provided, where the IC contact pads are connected to an IC on the IC wafer. An intermediate wafer having one or more intermediate contact pads is provided, where the intermediate contact pads are connected to an electro-optic arrangement on the intermediate wafer. The method further provides for direct copper bonding the IC contact pads to adjacent intermediate contact pads such that an electro-optic semiconductor package results.

INTERNATIONAL SEARCH REPORT

PCT/US 02/38027

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L21/60 G02B6/42 G02B6/43

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G02B H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 243 509 B1 (CHEN RAY T) 5 June 2001 (2001-06-05)	17-19
Y	claims 3,4; figure 1	1-16, 20-30
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Y	EP 0 801 423 A (HUGHES AIRCRAFT CO) 15 October 1997 (1997-10-15) the whole document	9-11, 20-25, 29,30
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- "Z" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 426 849 A (HASEGAWA SHINICHI ET AL) 27 June 1995 (1995-06-27) the whole document ----	9-11, 20-25, 29,30
A	US 6 204 164 B1 (ORCHARD-WEBB JONATHAN H) 20 March 2001 (2001-03-20) the whole document ----	
A	WO 92 11113 A (GEN ELECTRIC) 9 July 1992 (1992-07-09) the whole document ----	
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P,X	US 2002/076130 A1 (PANDRAUD GREGORY) 20 June 2002 (2002-06-20) the whole document -----	5,17

INTERNATIONAL SEARCH REPORT

PCT/US 02/38027

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-4,14-16,26,29,30

electrically bonding a chip to an an interposer by direct copper bonding

2. Claims: 5-13, 17-25, 27, 28

full integration of an optical arrangement including waveguide, coupler and electro-optic converter into an interposer

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PCT/US 02/38027

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